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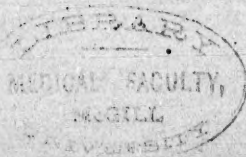
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**NOTES OF THREE HUNDRED AGGLUTINATION TESTS WITH
B. COLI COMMUNIS.**

BY

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Fellow in Pathology, McGill University.

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NOTES OF THREE HUNDRED AGGLUTINATION TESTS TRIED WITH B. COLI COMMUNIS.

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(From the Molson Pathological Laboratory, McGill University.)

In the absence of sufficient data upon the agglutinative action of blood serum upon *B. coli*, it was thought well to try this action in a routine of cases taken at random in the various wards of the hospitals; and, in addition, some healthy cases were observed. Many of the cases noted, were examined with a view to their Widal reaction, and those which gave the reaction are referred to as typhoid.

Technical Method.

Three forms of *B. coli* were isolated, selected from a number, and named I., II. and III.

I. Showed slight motility, slight fermentation and very slow formation of acid. It was isolated from the healthy bowel.

II., from the stomach of a case of pernicious anæmia (and proved to be *B. coli*), was of very slight motility, moderate acid-forming and slight coagulating ability, and of moderate gas-producing power.

III., was isolated from the bowel of a case of chronic diarrhoea, was of slight motility, strong acid-forming and coagulating power, and strong gas-producing power.

The limit of reaction fixed at one hour; and the dilution was in case of fresh serum, 1 in 10. Where the specimen was dried blood, a dilution was made as near as possible to 1 in 10, though of necessity this could be only estimated. Whenever a specimen was positive at 1 to 10, it was tried at 1-20, 1-30, etc., until reaction failed.

A complete reaction was decided to be present in those cases in which cessation of motion occurred, together with clumping and decided clearance or tendency to clearance of the field between the clumps. Where there was a distinct clumping without the field being cleared of free bacilli, the reaction was called "suggestive." These semi-reactions were fairly frequent, and no doubt indicate the cases in which a true reaction would occur if the dilution were 1-2, 1-3, etc., instead of 1-10.

Every hanging-drop was examined as a control previous to the serum being added to the culture, to prevent pseudo-reactions. This was especially necessary in the case of Colon iii, which at times would show a pseudo-reaction 2 to 3 hours after the bouillon had been inoculated.

It was found necessary in this case to use one of two expedients, viz.: (1) use the culture at a very early moment after inoculation, or (2) use a bouillon culture 3 to 5 days old, when the greater number of the bacilli settled as a sediment, and those in the supernatant fluid showed little, if any tendency to clump. At the same time, the question arises if, from some cause, such bacilli would not have lost their power of clumping to ordinary stimuli (such as that of bloom serum).

Results (300 Agglutination Tests).

Positive	10
Suggestive	18
Negative	272

Of 10 positive reactions, the distribution was:

With bacillus.	I. 1
" "	II. 1
" "	III. 8

Of 18 suggestive reactions, the distribution was:

With bacillus.	I. 1
" "	II. 2
" "	III. 15

Of the 10 positive in 1-10 dilution, one showed a positive reaction in 1-15 dilution; the others no higher than 1-10. One case only (a case of undiagnosed chronic stomach trouble, (gastritis) reacted to bot' ii and iii.

Of 10 positive reactions, the diseases were as follows :

Bronchitis	1
Typhoid (convalescent).	1
Anæmia	1
Gastric ulcer	1
Gastritis? (v. sup.)	1
Undiagnosed	5

Of 18 suggestive reactions, the diseases were as follows:

Appendicitis	2
Acute rheumatism	1
Bronchitis (acute)	1
Exoph. Goitre.	1
Typhoid.	3
Gastritis (v. sup.)	1
Organic heart disease	1
Undiagnosed	7
Normal	1

Of cases, possibly of *B. coli* infection, which gave no reaction, the following were tested :

Cholecystitis	1
Appendicitis	3
Typhoid	11
Probably typhoid, no certain data.	8

RESULTS, INFERENCES, ETC.

1. The greater liability to reaction of III, renders it very desirable that different races of *B. Coli* should be used, each one with a shorter series of cases than 100.

2. As has been frequently stated, the liability of a strongly acid and gas-producing bacillus to clump (so far as this series shows) is demonstrated.

3. It is desirable that the virulence of such a strongly acid and gas-producing bacillus, be tested; as it is probable that from its growth and character on different media III. would have proved to be the most virulent of the three forms selected.

4. It is also desirable that a dilution of at least 1 in 10 and a time limit not exceeding 1 hour be adopted, that the clumping power of normal blood serum be avoided.

5. It is desirable that a series of cases of such acute infections as are liable to be caused by *B. Coli*, should be tested. So far as the above series goes there appears to be no increased reaction observed in the cases of appendicitis, cholecystitis, etc.

From the number of positive typhoids which gave no reaction (in which the Widal test was made the crucial point), it, so far, does not differ from the observations already made by Drs. Johnston and MacTaggart, that a decided reaction of *B. Typhosus* is generally accompanied by a low degree of reaction to *B. Coli*.

6. If, as the researches conducted here by Drs. Adami, Nicholls and Ford seem most clearly to demonstrate, the colon bacilli and other bacteria are constantly being taken in small numbers into the system, and are to be found in the tissues in various stages of degeneration, then this mere taking up, even if constant, is not, under ordinary conditions of health, sufficient in man to develop any pronounced serum reaction against the colon bacillus. This would seem to indicate that the mere act of arrest of growth and destruction of bacteria by the tissues, does not in itself lead to the development of any large quantity of agglutinating substance in the circulating blood and may indicate that there must be an active proliferation of the bacteria in the tissues before any recognisable amount of agglutinating material is produced.

7. Lastly, remembering how abundantly the colon bacilli proliferate

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within the intestine under normal conditions, it would not have been surprising to find that human blood constantly exerted a very definite agglutinating action upon the colon bacillus. The very fact that the reaction is so relatively uncommon is of interest as showing that the presence of toxine-bearing and toxine-producing bacteria within the intestines does not result in the circulating blood containing what I may term, broadly, reactive substances. It is true that like those of the typhoid bacillus, the toxins of the colon bacillus only diffuse out with difficulty. It is difficult, however, to imagine that none of these toxins are discharged from the bodies of the bacilli when they are growing within the intestinal canal and that none are absorbed. Indeed, the results here presented, so far as they go, seem to indicate that for the development of agglutinating substances in recognisable amounts within the blood, there must be some very intimate reaction between bacilli which have invaded the tissues and the tissues themselves.

